SHORT REPORTS

Assessment of severity of paraquat poisoning

Gramoxone (20% paraquat) causes death in 70% of patients who take it by mouth. In contrast, Weedol (3% paraquat) causes death in only 10%.[1] Though there is a simple screening test for the presence of paraquat in urine, which allows a history of ingestion to be confirmed, there is no method of assessing the severity of the episode and therefore of predicting the clinical outcome. We report here a correlation between the clinical outcome of paraquat poisoning and the excretion rate of paraquat in urine.

Patients, methods, and results

Over two years 16 patients who had poisoned themselves with paraquat were referred from hospitals throughout the West Midlands to the regional poisoning treatment centre. Fourteen of the patients were men and the mean age was 44·8 years (range 21-72 years; table). Gastric aspiration and lavage were performed in all cases. Fuller's Earth (250 ml 30% solution) and magnesium sulphate (20 ml 40% solution) were then given by mouth every six hours. Three patients (cases 11, 12, and 16) were treated by haemoperfusion through a charcoal column and four (cases 2, 3, 9, and 13) by forced diuresis.

All six of the patients who took Gramoxone died, but nine of the 10 who ingested Weedol survived. Four of those dying did so within 96 hours of ingestion; the remainder lived for up to 12 days. All patients who died showed evidence of liver and renal damage. Four survivors developed mild liver damage and two mild impairment of renal function. All survivors finally made a complete physical recovery.

Toxicology—Paraquat was assayed by colorimetry after extraction with an ion-exchange resin.[2] The procedure is easy to perform but takes two hours to complete. Total amounts excreted ranged from 0·6 mg to 386 mg. Hourly excretion rates were calculated for urine collected during the first few hours after admission (see table). Assays of sequential urine samples showed that the excretion rate of paraquat fell rapidly during the first 48 hours, although it diminished less rapidly in those who eventually died. The patient (case 12) who developed oliguria during the first 24 hours had a massive amount of paraquat in his urine.

All patients who excreted 1 mg/h or more of paraquat eight hours or more after ingestion died. One patient (case 3) excreted 1·1 mg paraquat per hour between four and a half and seven hours after ingestion, but the excretion rate then fell rapidly.

Comment

Paraquat, although taken by very few self-poisoned patients, is a significant cause of death in patients admitted to hospital. During the first 8-10 hours after ingestion, and despite the administration of Fuller's Earth, absorption is probably continuing. Excretion rates probably reflect plasma concentrations and can be interpreted only with reference to the length of time after ingestion. Though it has been claimed that urine assays are not helpful in the early assessment of poisoning,[3] we have found that a high mortality is associated with excretion rates of over 1 mg/h more than eight hours after ingestion. We do not have enough data to predict a "safe" excretion rate at 24 hours. Neither haemoperfusion nor forced diuresis appeared to affect the excretion rate appreciably. Until a rapid, easy, and reliable blood assay is available, urinary excretion rate is the only way of assessing severity of poisoning.

[1] Park, J, Proudfoot, A T, and Prescott, L F, *Clinical Aspects of Paraquat Poisoning*, ed K Fletcher, p 46. Macclesfield, Imperial Chemical Industries Ltd, 1977.
[2] Berry, D J, and Grove, J, *Clinica Chimica Acta*, 1971, **34**, 5.
[3] *Lancet*, 1976, **1**, 1057.

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Whole gut irrigation: a new treatment for constipation

Faecal stasis, constipation, and rectal impaction are grave problems for elderly patients and their attendants. Faecal impaction leads to faecal incontinence, which may necessitate admission to hospital. Despite the seriousness of the problem, doctors tend to regard it lightly and to consider it a matter for the nursing staff.

When first referred many elderly patients are severely constipated, often with a heavily loaded pelvic colon and rectum. The overloading sometimes extends as far back as the ascending colon and even the caecum. The clearing of these heavily laden bowels and the re-establishment of a more normal transit time and bowel activity pattern is difficult, unpleasant, and exhausting. In an effort to find a more successful and less humiliating process than the customary daily enema, we decided to try the technique of whole gut irrigation used by gastroenterologists for preparing the bowel for surgery and colonoscopy.[1 2] Some of the reported patients were elderly yet tolerated the procedure well. This procedure has also been used in severely constipated patients before operation.[1]

Methods and results

After diagnosing faecal stasis from the history, rectal examination, and plain radiographs of the abdomen, we gave a softening agent for five days before the irrigation. The technique was explained to the patient. A nasogastric tube was passed. Separate intravenous injections of frusemide 40 mg and metoclopramide 10 mg were given. Isotonic saline at roughly body

Details of self-poisoning with paraquat and outcome

Case No	Age and sex	Formulation and (estimated amount of paraquat ingested (g))	Outcome	1st urine collection			
				Time started after ingestion of paraquat (h)	Duration (h)	Volume (ml)	Paraquat excretion rate (mg/h)
1	42 M	Weedol (0·4)	Survived	6	4	460	0·2
2	42 M	,, (0·5)	,,	8	3	520	0·15
3	55 M	,, (1·8)	,,	4·5	2·5	210	1·1
4	50 F	,, (0·9)	,,	11	24	1300	0·05
5	24 M	,, (0·1)	,,	5·5	16·5	1800	0·03
6	54 M	,, (0·1)	,,	12	14	2600	0·12
7	33 M	,, (1·8)	,,	10	36	840	0·16
8	62 F	,, (1·1)	,,	0	23	560	0·11
9	42 M	,, (1·9)	,,	0	19	4200	0·34
10	57 M	,, (1·8)	Died	12	10	850	1·0
11	68 M	Gramoxone (3·0)	,,	6	4	1025	32
12	74 M	,, (10·0)	,,	0	4	545	24
13	21 M	,, (5·0)	,,	12	2	425	1·0
14	43 M	,, (10·0)	,,	10	2	315	4·3
15	53 M	,, (19·0)	,,	8	2	280	>1·5
16	34 M	,, (8·0)	,,	7	6	360	1·1